Assessment of the ECCO2 coupled ocean and sea ice solution in the Arctic

One of the primary objectives of the Estimating the Circulation and Climate of the Ocean, Phase II (ECCO2) project is to realistically estimate the Arctic ocean circulation and sea ice distribution during the ocean satellite era (1978-present). The ECCO2 solution is obtained by fitting a high-resolution (18-km horizontal grid spacing) global-ocean and sea-ice configuration of the Massachusetts Institute of Technology general circulation model (MITgcm) to the available ocean and sea ice data. Here, we compare results of a series of MITgcm sensitivity experiments to satellite and in-situ measurements of(a) sea ice thickness and concentration, (b) sea ice and freshwater fluxes, and (c) ocean temperature/salinity and circulation. An assessment of the model's ability to produce and maintain important water masses such as the warm Atlantic water and cold halocline will be presented. Additional comparison with Arctic Ocean Model Intercomparison Project (AOMIP) will be used to address model deficiency and near-future improvements. This work is a first step toward obtaining an optimized solution for the Arctic ocean and sea ice through data-model residual minimization.